

Application No. 10/009,356
Reply to Office Action of Sept. 15, 2004

Amendments to the Claims

The following listing of the claims will replace all prior versions, and listings of the claims in the application:

Listing of Claims

1-5. (Canceled)

6. (Original) A disk drive comprising:
a disk,
a balancer for movably accommodating one or plural magnetic balls in the ring-shaped hollow section thereof and provided with a magnet for attracting said magnetic balls inside said ring-shaped hollow section, and
an impact detection section for detecting an impact caused by the behavior of said magnetic ball.

7. (Original) A disk drive comprising:
a disk,
a balancer for movably accommodating one or plural magnetic balls in the ring-shaped hollow section thereof and provided with a magnet for attracting said magnetic balls inside said ring-shaped hollow section,
an impact detection section for detecting an impact caused by the behavior of said magnetic ball, and
a rotation speed detection section for detecting the rotation speed of said disk at the time of the detection of said impact.

8. (Amended) A disk drive in accordance with [[1]] 7, further comprising:
an impact detection section for detecting an impact caused by the behavior of said magnetic ball, and
a rotation speed detection section for detecting the rotation speed of said disk at

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the time of the detection of said impact, wherein

said impact detection section detects the timing of the separation of said magnetic ball from said magnet, and

said rotation speed detection section detects the rotation speed of said disk at the timing of said separation.

9. (Original) A disk drive in accordance with claim 7, wherein
said impact detection section detects the timing of the attraction of said magnetic ball by said magnet, and

said rotation speed detection section detects the rotation speed of said disk at the timing of said attraction.

10. (Amended) A disk drive in accordance with claim 7, wherein said impact detection section detects an impact on the basis of ~~the~~ an output signal of said an optical pickup.

11. (Original) A disk drive in accordance with claim 10, wherein said impact detection section detects an impact on the basis of the focus error signal or the tracking error signal of said optical pickup.

12. (Previously presented) A disk drive in accordance with claim 7, wherein said impact detection section is a piezoelectric ceramic sensor.

13. (Canceled)

14. (Amended) A disk drive comprising:
a disk,
a balancer for movably accommodating one or plural magnetic balls in the ring-shaped hollow section thereof and provided with a magnet for attracting said magnetic balls inside said ring-shaped hollow section, wherein
in the case when reproduction, ~~or~~ recording, or seek operation is carried out

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~~continuously~~ in a region from a first position to another position on said disk,

~~when if~~ the maximum value of the disk rotation speed for the operation in said region is lower than a separation rotation speed at which said magnetic ball in the attraction state separates from said magnet and higher than an attraction rotation speed at which said magnetic ball in the separation state is attracted by said magnet, and

~~when if~~ the minimum value of the disk rotation speed for the operation in said region is not more than said attraction rotation speed at which said magnetic ball in the separation state is attracted by said magnet,

the rotation speed of said disk is set at said attraction rotation speed or less before reproduction, or recording or seek operation.

15. (Original) A disk drive in accordance with claim 14, wherein the relationship expression of $f_0 \times \{(\text{the rotation speed at the innermost periphery}) / (\text{the rotation speed at the outermost periphery})\} < f_1$ is established, wherein f_1 designates the rotation speed at which said magnetic ball separates and f_0 designates the rotation speed at which said magnetic ball is attracted.

16. (Previously presented) A disk drive in accordance with claim 14, comprising:
an impact detection section for detecting an impact caused by the behavior of said magnetic ball, and

a rotation speed detection section for detecting the rotation speed of said disk at the time of the detection of said impact, wherein

said impact detection section detects the timing of the separation of said magnetic ball from said magnet, and said rotation speed detection section detects the rotation speed of said disk at the timing of said separation, and

said impact detection section detects the timing of the attraction of said magnetic ball by said magnet, and said rotation speed detection section detects the rotation speed of said disk at the timing of said attraction.

17. (Original) A disk drive comprising:

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a balancer for movably accommodating one or plural magnetic balls in the ring-shaped hollow section thereof and provided with a magnet for attracting said magnetic ball; inside said ring-shaped hollow section, and
a behavior detection section for detecting the behavior of said magnetic ball.

18. (Original) A disk drive in accordance with claim 17, wherein the housing of said ring-shaped hollow section is formed of a transparent material, and said behavior detection section is a photosensor.

19. (Original) A disk drive in accordance with claim 18, wherein the housing of said ring-shaped hollow section has a light-gathering section.

20. (Original) A disk drive in accordance with claim 17, wherein the housing of said ring-shaped hollow section is formed of a nonmetallic material, and said behavior detection section is an electrostatic capacitance type sensor.

21. (Original) A disk drive in accordance with claim 17, wherein a determination is made as to whether said magnetic ball is rolling along the external peripheral face of said ring-shaped hollow section or not by comparing the period of the output signal of said behavior detection section with the period of the output signal of a rotation speed detection section for detecting the rotation speed of said disk.

22. (Original) A disk drive in accordance with claim 17, wherein a determination is made as to whether said magnetic ball has been attracted by said magnet or not on the basis of the output signal of said behavior detection section.

23. (Original) A disk drive in accordance with claim 17, wherein
a determination is made as to whether said magnetic ball is rolling along the external peripheral face of said ring-shaped hollow section or not by comparing the period of the output signal of said behavior detection section with the period of the output signal of said

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rotation speed detection section for detecting the rotation speed of said disk,
another determination is made as to whether said magnetic ball has been attracted
by said magnet or not on the basis of the output signal of said behavior detection signal, and
the operation mode is shifted to reproduction or recording after said two
determinations are made.

24. (Amended) A disk drive in accordance with claim ~~[[1]]~~ 17, further comprising:
a behavior detection section for detecting the behavior of said magnetic ball, and
a rotation speed detection section for detecting the rotation speed of said disk,
wherein said behavior detection section detects the timing of the separation of said magnetic ball
from said magnet, and said rotation speed detection section detects the rotation speed of said disk
at the timing of said separation.

25. (Original) A disk drive in accordance with claim 17, further comprising:
a rotation speed detection section, wherein said behavior detection section detects
the timing of the attraction of said magnetic ball by said magnet, and said rotation speed
detection section detects the rotation speed of said disk at the timing of said attraction.

26. (Amended) A disk drive in accordance with claim ~~[[24]]~~ 17, further comprising:
a behavior detection section for detecting the behavior of said magnetic ball, and
a rotation speed detection section for detecting the rotation speed of said disk,
wherein

said behavior detection section detects the timing of the separation of said
magnetic ball from said magnet,
said rotation speed detection section detects the rotation speed of said disk at the
timing of said separation,
said behavior detection section detects the timing of the attraction of said
magnetic ball by said magnet, and
said rotation speed detection section detects the rotation speed of said disk at the
timing of said attraction.

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27 -28 (Canceled)

29. (Amended) A disk drive in accordance with claim 8, wherein said impact detection section detects an impact on the basis of the an output signal of ~~said~~ an optical pickup.

30. (Amended) A disk drive in accordance with claim ~~[[29]]~~ 8, wherein said impact detection section detects an impact on the basis of an output signal of an optical pickup, the focus error signal or the tracking error signal of said optical pickup.

31. (Original) A disk drive in accordance with claim 8, wherein said impact detection section is a piezoelectric ceramic sensor.

32. (New) A disk drive comprising:
a disk, and
a balancer for movably accommodating one or plural magnetic balls in the ring-shaped hollow section thereof and provided with a magnet for attracting said magnetic balls inside said ring-shaped hollow section, wherein
in the case when reproduction, recording, or seek operation is carried out in a region from a first position to another position on said disk,
if the minimum value of the disk rotation speed in the operation in said region is not less than an attraction rotation speed at which said magnetic ball in the separation state is attracted by said magnet,
said disk rotation speed is once raised to a separation rotation speed or more, so that said magnetic ball becomes in a separation state before reproduction, recording or seek operation, and then reproduction, recording or seek operation is carried out.